



NPOESS Preparatory Project (NPP) NASA Science Data Segment (SDS) Ocean PEATE Activities



May 18, 2011

Ocean PEATE Team



SDS Overview



- The NPP NASA Science Data Segment (SDS) is a distributed system consisting of:
 - Central Science Data Delivery and Depository Element (SD3E)
 - Discipline-specific Product Evaluation and Analysis Tools Elements (PEATEs)
 - NPP Instrument Calibration Support Element (NICSE)
 - Integration and Test Support Element (I&TSE) – the mini-IDPS
 - Project Science Office Element (PSOE)
- The PEATEs are supported by existing NASA discipline data processing centers.



SDS Level 1 Requirements



- 2.1.2.1 The SDS shall be designed with the assumption that the operational IPO IDPS generated NPP EDRs **do not require reprocessing or re-computation in order to support climate research needs**. Consequently, the SDS **will not be designed to routinely generate climate data products** which require long-term archival in the ADS.
- 2.1.2.3 In developing the SDS, the Project **shall assume that EDRs produced by the IDPS are climate quality** and put in place the capability to test that hypothesis in order to contribute to improving the quality of future EDRs. The SDS shall provide suggested algorithm improvements to the IDPS.

The SDS is NOT tasked to produce data products for distribution.



Primary Tasks of the Ocean PEATE



- Acquire and store VIIRS data products. These are generated by the Interface Data Processing Segment (IDPS) and acquired via the SD3E and the NOAA Archive Data Segment/Comprehensive Large-array Archive and Stewardship System (ADS/CLASS):
 - Raw Data Records (RDRs) – Level-0 equivalent
 - Sensor Data Records (SDRs) – Level-1B equivalent
 - Environmental Data Records (EDRs) – Level-2 equivalent
 - **There are no Level-3 equivalent products.**
- Support the VIIRS Ocean Science Team (VOST) in the assessment of the quality of the NPP Ocean EDRs for accomplishing NASA's climate research requirements.
- Provide suggested algorithm improvements to the IDPS via the Project Science Working Group (PSWG).
- Process selected data subsets in support of Evaluation and Validation activities.



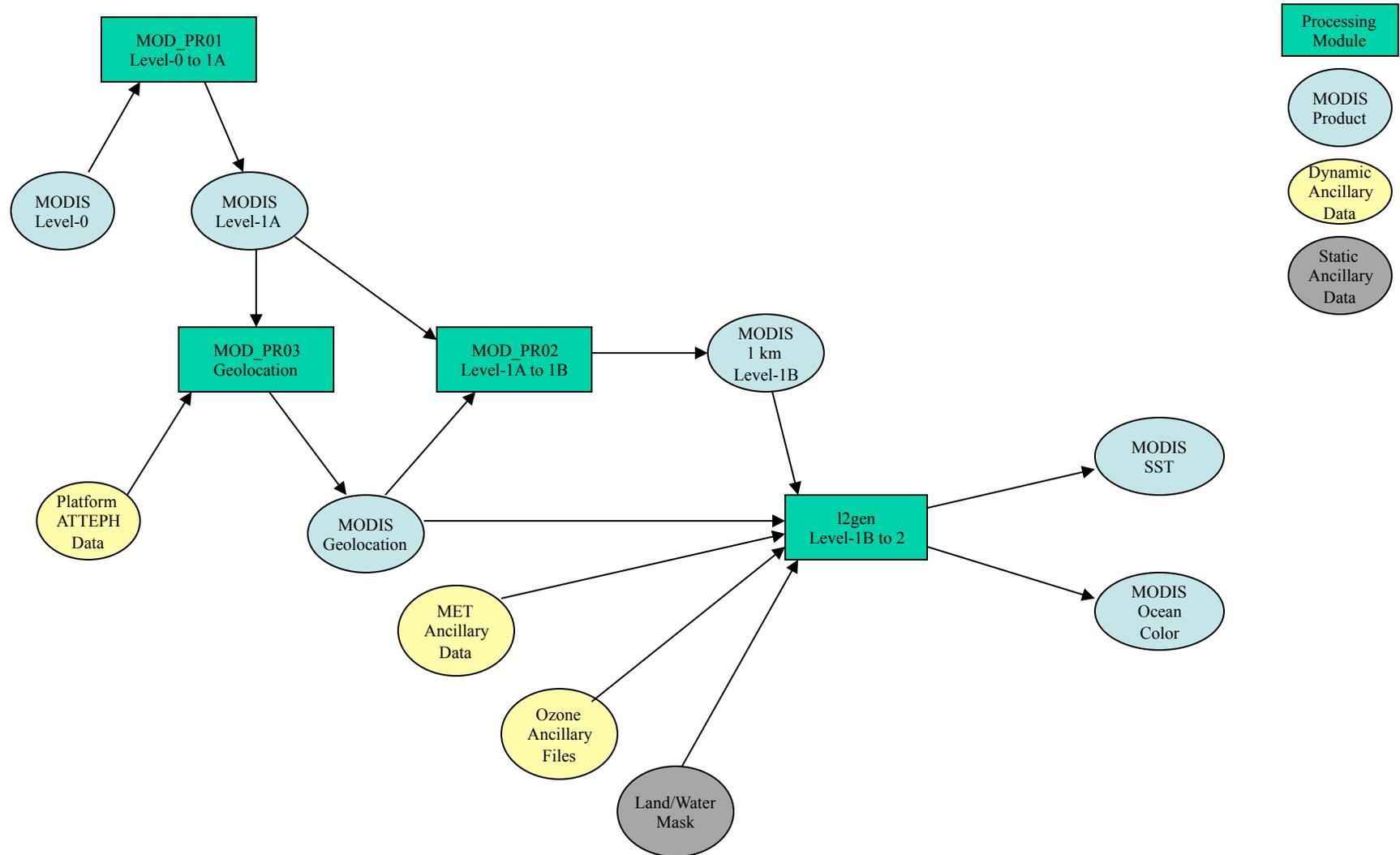
VIIRS Ocean Products for Evaluation



- All VIIRS Ocean products to be evaluated will be acquired from the IDPS, ADS/CLASS, or the mini-IDPS.
- Testing and evaluation of algorithm changes will require regenerating product time series in the mini-IDPS, to be downloaded to the Ocean PEATE.
- The Ocean PEATE will design changes to the code in the mini-IDPS for the purpose of algorithm improvement or problem resolution, develop appropriate test cases and request runs to verify and evaluate the changes.

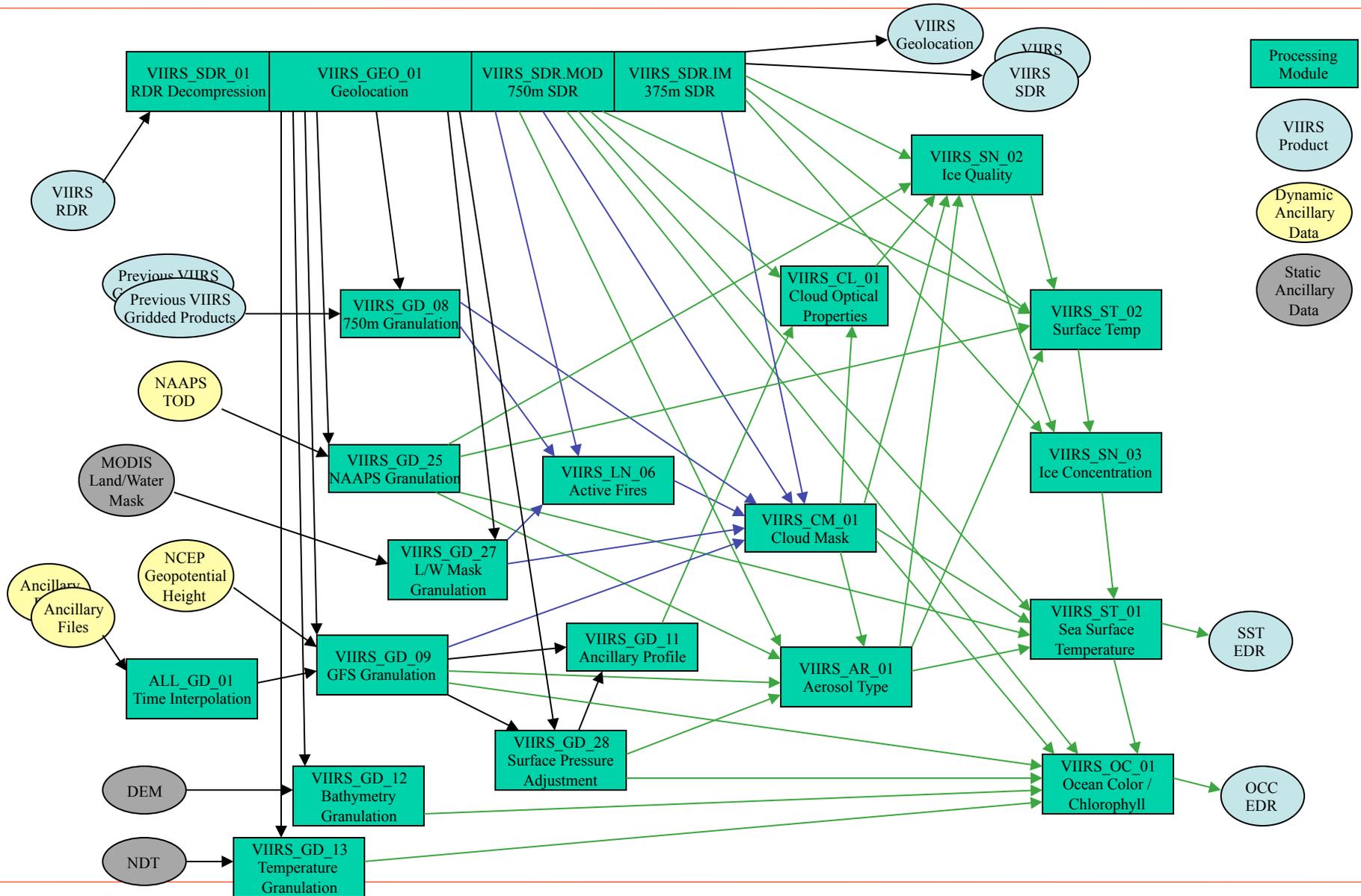


MODIS Ocean Data Flow





IDPS VIIRS Ocean EDR Data Flow





VIIRS Ocean EDRs



- The Ocean Color and Chlorophyll (OCC) EDR contains:
 - Chlorophyll-a concentration
 - nLw at 412, 443, 488, 555 and 672 nm
 - IOP-a at 412, 443, 488, 555 and 672 nm
 - IOP-s at 412, 443, 488, 555 and 672 nm
 - Quality flags
- The Sea Surface Temperature (SST) EDR contains:
 - Skin SST
 - Bulk SST
 - Quality flags
- The content and structure of the NPP data products are described in the Common Data Format Control Books.



Evaluation Vs. Product Level



- Level-1 (SDR) Evaluations
 - Onboard calibration analyses
 - Vicarious calibration
- Level-2 (EDR) Evaluations
 - Matchup analyses
 - Residual detector (striping) and scan (RVS) dependence
- Level-3 Product Evaluations
 - Sensor cross-comparisons
 - Algorithm comparisons
 - Temporal anomaly evaluations



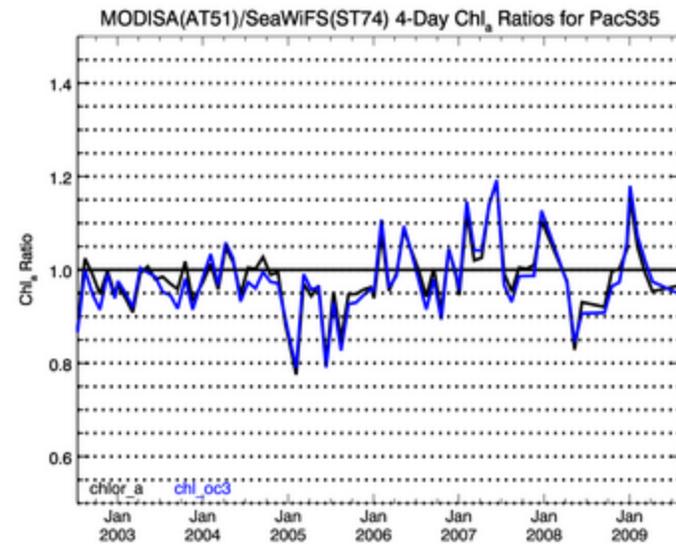
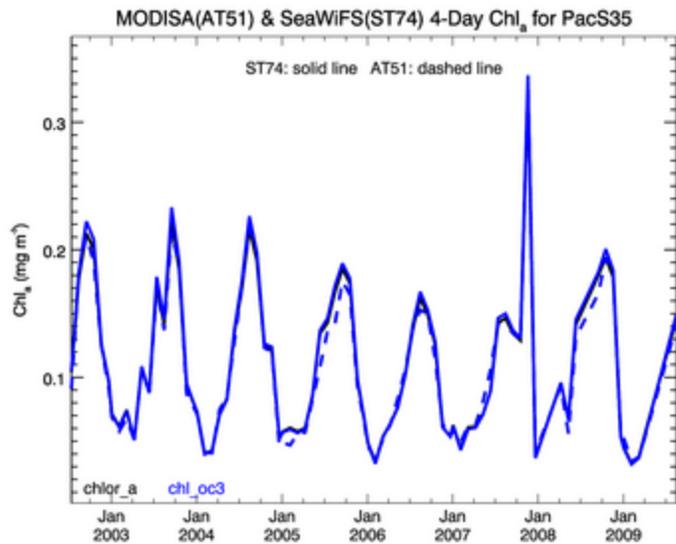
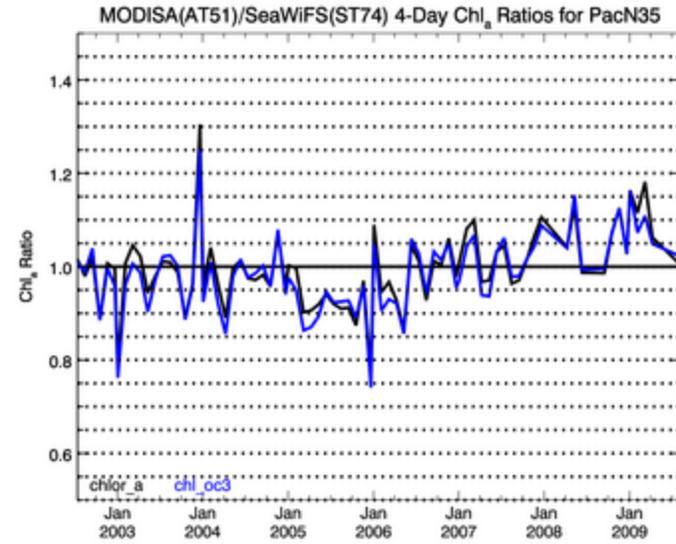
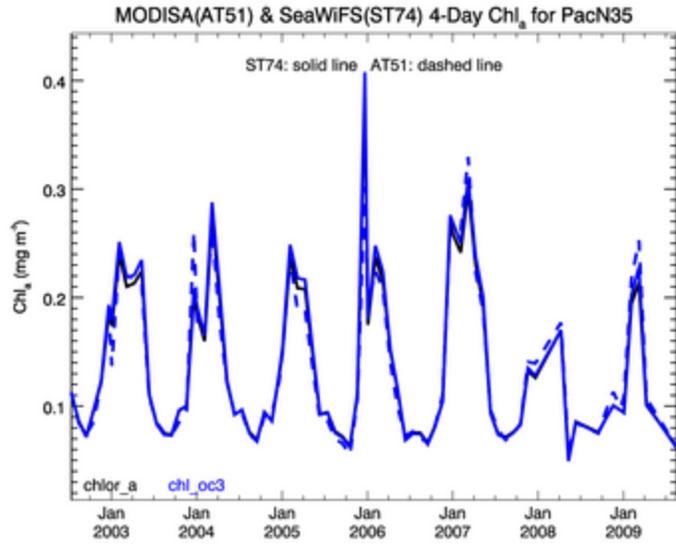
Level-3 Product Generation



- Sensor and algorithm cross-comparisons and interannual comparisons require Level-3 products. The IDPS does not produce the equivalent of Level-3 Ocean products.
- The Ocean PEATE has implemented software to process VIIRS EDRs to Level 3 binned products in current OBPG format.
 - Current OBPG binning code with new EDR input functions
- This will automatically provide the additional capabilities to produce multi-temporal composites and standard mapped image (SMI) products.



Example: Sensor Zonal Cross-Comparisons





Ocean PEATE Status



- Acquire, ingest and catalog NPP VIIRS data products: RDRs, SDRs and Ocean EDRs (Data Acquisition & Ingest and Data Cataloging).
 - Status: Complete and in use to support NPP data flows
- Process Ocean EDRs (SST and OCC) to Level-3 to support data product and algorithm evaluations (Level-3 Scheduler, VDC and Level-3 binner).
 - Status: Complete
- Perform VIIRS EDR matchups with Ocean CARS *in situ* data (extract code).
 - Status: Complete



Ocean PEATE Status (cont).



- Incorporate processing of VIIRS SDRs for vicarious calibration analysis.
 - Status: Complete, final testing to be performed.
- Produce VIIRS simulated data using VOST-developed software.
 - Status: Simulator installed and running in ODPS.
- Support distribution of data products to team members.
 - Status: Need to implement restricted distribution.



Distribution of NPP Data Products



- The ADS/CLASS is the official portal for all NPP distributed data products.
- The Ocean PEATE will support distribution of available products (i.e., those that have been acquired for evaluation), restricted to VIIRS Ocean Science Team members.



VIIRS Product Distribution Page



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Tuesday, 12 April 2011
(2011102)

SeaWiFS

 GAC
 MLAC

MODIS (Aqua)
 VIIRS (NPP)(simulated)
 OCTS (ADEOS)

MODIS (Terra)
 MERIS (Envisat)
 CZCS (Nimbus-7)

Day
 Night

Radius (km) about map click or about typed-in location:

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<input type="radio"/>	400
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Select swaths containing (at least):

<input checked="" type="radio"/>	any part
<input type="radio"/>	25 %
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<input type="radio"/>	all

of the area of interest.

Select only scenes having in situ matchups.



Quasi True Color

Select one or more regions:

- AdriaticSea
- AegeanSea
- Antarctica
- ArabianSea
- AralSea
- Arctic
- Australia
- AustraliaCoast
- Azores
- Bahamas
- BalticSea

or specify boundary coordinates or a single location:

N:

W: :E:

S:

[Find swaths](#)

Display results at a time.

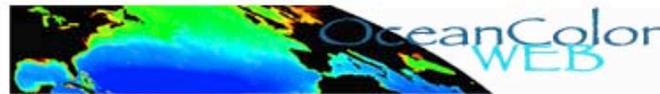
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April 2011						
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NPP Ground Segment Testing



- The NPP Project System Integration and Test (SI&T) team completed NPP Compatibility Test 3 (NCT3) Part 2 in April.
- This test flowed 72 hours of data through all systems and facilities of the NPP Ground Segment, including the PEATES.
- The next scheduled major data flow is NCT4 in July.
- All VIIRS products acquired by the Ocean PEATE during tests will be available to Science Team members.



Conclusion



- Ocean PEATE requirements will be supported using the proven capabilities of the ODPS, which will support EDR evaluation strategies successfully employed on current missions.
 - Our approach provides progressive stages of evaluation for Level-1B (SDR), Level-2 (EDR) and Level-3 products.
 - Evaluation methodologies and tools are already established for data sets cataloged within the ODPS.
 - Additional development effort (Level-3 products) leverages existing software.
- The charter of the PEATE is to support NASA's evaluation of the NPP data products.
- However, if NASA assigns additional responsibilities and provides resources, the OBPG has the capability to support VIIRS at the same level as MODIS and SeaWiFS.